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12/27/2001

John D. Maxfield

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1506

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10/06/2006

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EXAMINER

BLACK, LINH

ART UNIT

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Technology Center 2100

**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/034,438  
Filing Date: December 27, 2001  
Appellant(s): John D. Maxfield

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Sean McDermott  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 7/10/2006 appealing from the Office action mailed 2/9/06.

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**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings, which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(8) Evidence Relied Upon**

6,411,964	Iyer et al.	6-2002
6,584,474	Pereira	6-2003
6,0003,022	Eberhard et al.	12-1999

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 103***

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 18-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iyer et al. (US 6411964), and further in view of Pereira (US 6584474).**

Iyer et al. teach the independent claims 18, 28 by the following:

identifying a first range of key values associated with a first set of rows in a database file – fig. 4, elements 400-404: clustering index; col. 4, lines 5-31; col. 6, lines 6-63; col. 12, lines 8-24.

assigning first values to each of a plurality of free space management parameters associated with the first range of key values – col. 6, lines 6-63; col. 7, lines 11-36; fig. 11, element 1126; col. 17, lines 49-60.

identifying a second range of key values associated with a second set of rows in the database file; assigning second values to each of a plurality of free space management parameters associated with the second range of key values – col. 6, lines 7-62, especially lines 37-44; col. 7, lines 11-36; fig. 11, element 1126; col. 17, lines 49-60 (in which Desired Page D<sub>P</sub> is calculated based on the size of R, page size, desired frequency of free pages, desired percent of free space per page, etc. , and the procedure CLUSTER\_RECORD being called with the RID of R and D<sub>P</sub> as its parameters); col. 22, lines 41-66 (wherein a user has a position (key value) in a key range of the index or relevant subset of the index 110 is scanned; creating DL 800 structures (indices 802 etc.); Correct the composite RID list according to the composite DL 800.

managing free space associated with the first set of rows in accordance with the first values; and managing free space associated with the second set of rows in accordance with the second values - col. 4, lines 17-31; col. 6, lines 37-62; col. 10, lines 15-63.

However, Iyer et al. do not explicitly disclose wherein the second values differ from the first values by at least one free space management parameter value, thereby producing non-uniform distribution of free space in the database file. Pereira (US 6584474) teaches to provide a comprehensive analysis of at least one database table to determine an information set relating to the health of the tables analyzed...including rows, average free space, percentage free threshold...col. 2, lines 18-41; the DBA sets the PCTFREE variable depending on how the database table is to be used. For example, if a table is to have frequent updates, additional PCTFREE would be established so that enough space is available to allow any necessary row migration to occur within the same block...- col. 4, lines 4-50. Therefore, depends on the on how a table/segment/partition is to be used, the associated free space can be determined/managed accordingly, and thus, free space is distributed non-uniformly within a database file. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Iyer et al's teaching with Pereira's teaching to better

allow the free space be distributed to tables/segments/partitions of data based on their usages, thereby, increases database system's performance.

Iyer et al. anticipated claim 19 by the following:

wherein the first set of rows are associated with a first table in the database file and the second set of rows are associated with a second table in the database file – col. 4, lines 5-43; col. 6, lines 7-25.

Iyer et al. anticipated claims 20, 29 by the following:

wherein the first range of key values designate a contiguous range of rows as indicated by the first key value and the second key value – fig. 4, items 400 and 402 (AF); col. 6, lines 53-62.

Iyer et al. anticipated claims 21, 30 by the following:

wherein the second range of key values defines a contiguous range of rows as indicated by the third key value and the fourth key value - fig. 4, items 400 and 402 (GM); col. 6, lines 53-62; col. 4, line 63 to col. 5, line 23.

Iyer et al. anticipated claim 22 by the following:

wherein one or more of the free space management parameters are selected from the group consisting of "free page value", "free pages value", "percent

free value", end of key range number of free pages", and "maximum number of rows" – col. 5, lines 24-34; col. 6, lines 26-36; col. 11, lines 8-17; col. 17, lines 49-52; col. 22, lines 41-66.

As per claim 23-24, Iyer et al. do not explicitly disclose wherein the act of assigning first values to each of a plurality of free space management parameters comprises accepting user input for at least one of the first values, second values. However, Pereira teaches to provide a comprehensive analysis of at least one database table to determine an information set relating to the health of the tables analyzed...including rows, average free space, percentage free threshold...col. 2, lines 18-41; the DBA sets the PCTFREE variable depending on how the database table is to be used. For example, if a table is to have frequent updates, additional PCTFREE would be established so that enough space is available to allow any necessary row migration to occur within the same block...- col. 4, lines 4-50. Therefore, depends on the on how a table/segment/partition is to be used, the associated free space can be determined/managed accordingly by a user, and thus, free space is distributed non-uniformly within a database file. Pereira also teaches a user (database operator, DBA, or other mechanism inquiring as to the condition of a database table) first identifies the tables of which the condition is to be determined – col. 11, lines 63-66. Thus, it



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would have been obvious to one of ordinary skill in the art at the time of the invention to combine Iyer et al's teaching with Pereira's teaching to better allow the free space be distributed to tables/segments/partitions of data based on their usages, thereby, increases database system's performance.

Iyer et al. anticipated claim 25-27 by the following:

wherein the first set of rows in a tablespace comprise rows in a data table or an index; wherein the second set of rows in a tablespace comprise rows in a data table or an index; and wherein the first sets of rows and the second set of rows comprise rows from a single table – col. 4, lines 5-42; col. 6, lines 6-62.

Iyer et al. anticipated claim 31 by the following:

identify the first range of key values associated with the first set of rows in the database file/table/index comprise instructions to identify rows from a first table – col. 22, lines 38-46.

identify the second range of key values associated with the second set of rows in the database file/table/index comprise instructions to identify rows from a second table – col. 5, lines 19-43; col. 6, lines 47-62.

Iyer et al. anticipated claim 32 by the following:

wherein the first table comprises a data table or an index and the second table comprises a data table or an index – col. 3, line 61 to col. 4, line 31.

Iyer et al. anticipated claims 33, 34 by the following:

wherein the database file is a page set / partition – fig. 1, items 104, 110;  
col. 3, line 61 to col. 4, line 31.

Claims 35-42 are rejected under 35 U.S.C. 103(a) as being unpatentable  
over Iyer et al. (USP 6411964), and further in view of Eberhard et al. (USP  
6003022).

As per claims 35, 39, Iyer et al. teach

designating a first set of rows of a file object with a first range of key values  
– fig. 4, elements 400-404: clustering index; col. 4, lines 5-31; col. 6, lines  
6-63; col. 7, lines 11-36; fig. 11, element 1126; col. 12, lines 8-24; col. 17,  
lines 49-60.

designating a second set of rows of the file object with a second range of  
key values – col. 6, lines 7-62, especially lines 37-44; col. 7, lines 11-36;  
fig. 11, element 1126; col. 17, lines 49-60 (in which Desired Page D\_P is  
calculated based on the size of R, page size, desired frequency of free pages,  
desired percent of free space per page, etc. , and the procedure  
CLUSTER\_RECORD being called with the RID of R and D\_P as its  
parameters); col. 22, lines 41-66 (wherein a user has a position (key value)  
in a key range of the index or relevant subset of the index 110 is scanned;

creating DL 800 structures (indices 802 etc.); Correct the composite RID list according to the composite DL 800.

Iyer et al. does not explicitly disclose non-uniformly distributing free space within the first and second sets of rows of the file object by distributing free space differently for the first range of key values than for the second range of key values. However, Eberhard et al. teach database execution cost and system performance estimator – the abstract. Eberhard et al. teach accepting user input for at least one of the first values – col. 7, lines 35 to col. 8, line 5; fig. 2c, item 222 (table definition in 2c allows user to define/assign pctfree for each table, in this example table STOCK. Users have the ability to assign different pctfree to different tables/partitions. Thus, free space is distributed non-uniformly between tables/partitions of data). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Iyer et al.'s teaching with Eberhard et al.'s teaching in order to allow more flexible utilization of free spaces, which is more appropriately changed to different usage environments.

As per claims 36, 40, Iyer et al. additionally teach wherein the first object is selected from the group consisting of a page set, a table within a database file, and a plurality of tables in a database file - fig. 1, items 104, 110; col. 3, line 61 to col. 4, line 31.

As per claims 37, 41, Iyer et al. additionally teach assigning first values to each of a plurality of free space management parameters associated with the first range of key values for the first set of rows managing free space associated with the first set of rows in according with the second values - fig. 4, items 400 and 402 (AF); col. 6, lines 53-62; col. 5, lines 19-43; col. 6, lines 47-62; col. 22, lines 38-46.

As per claims 38, 42, Iyer et al. additionally teach assigning second values to each of a plurality of free space management parameters associated with the second range of key values for the second set of rows, wherein the second values differ from the first values by at least one free space management parameter value managing free space associated with the second set of rows in accordance with the second values - fig. 4, items 400 and 402 (GM); col. 6, lines 53-62; col. 4, line 63 to col. 5, line 23.

***Response to Arguments***

Applicant's arguments filed 10/4/2005 have been fully considered but they are not persuasive.

Applicants state on page 8 that, "the status of claims 28-30 and 34 is not clear". Examiner states in the document dated 7/5/05, page 7, section 13 that "claims 28-30 and 34, claims the same subject matter as of claims 18-27, 31-33, and are rejected based on the same rejections as of claims 18-27, 31-33." Examiner follows the claims' order, thus, the statement is in the 103-section. However, the statement is clear.

On page 8, last paragraph, Applicants state on page 8, last paragraph and page 9 that Iyer et al. teach "uniformly manage the free space in one file". Examiner finds the statement not persuasive. It is not novel in the art that free space parameters are assigned to tables based on the usage of tables – for example, please see Pereira (USP 6584474), the DBA sets the PCTFREE variable depending on how the database table is to be used. For example, if a table is to have frequent updates, additional PCTFREE would be established so that enough space is available to allow any necessary row migration to occur within the same block...- col. 4, lines 4-50. Therefore, depends on the on how a table/segment/partition is to be used, the associated free space can be determined/managed accordingly, and thus, free space is distributed non-uniformly within a database file.

However, as records have been added, deleted, inserted etc...Iyer et al. teach that the storage structures can degrade. Reorganization removes such structural degradation. Specifically, reorganization distributes free space evenly. This does not mean that Iyer et al. teach: "uniformly manage the free space in one file". This means that the free space assigned to a set of rows/table/partition etc...would be degraded and the reorganization process will help distribute free space as defined. In addition, Pereira (US 6584474) further improve Iyer et al.'s teaching in allowing users to assign free space to the set or rows/table/partition based on how the set of rows/table to be used - col. 4, lines 4-50.

In response to the Applicants' statement on page 10, claims 35-42 are rejected under U.S.C. 103(a) to Iyer et al. in view of Eberhard et al. Dependent claims 36-38 are not rejected under U.S.C. 102. Iyer et al. additionally teach these limitations.

## **(10) Response to Argument**

### **Argument I**

Appellant argues on pages 14-17 section 4 that Iyer in view of Pereira fails to disclose each claimed element of independent claims 18 and 28. Especially in the 4(b) section, Appellant states that: "At no time does Iyer teach that a database file's free space may be managed non-uniformly. At no time does Iyer even suggest that such an operation may be beneficial... Iyer actually teaches away from the claimed elements of these independent claims. In addition, Iyer makes no mention of assigning different free space parameters to different ranges of key values... Pereira fails to provide the claimed elements missing from Iyer... At no time doe Pereira teach that the database table's free space may be managed non-uniformly..."

**In response** to the Appellant's above argument, Examiner disagrees. The second prior art Pereira was used to show that a database file's free space may be managed non-uniformly. However, Iyer et al. teach in fig. 1, and col. 4, lines 5-30 that the same table space TS#1 with different partitions: P1, P2, P3 that tables and the reorganizer 112 comprises logical and physical arrangement of the tables and the associated indices; Fig. 4 and col. 6, lines 3-63, the clustering index 400 with the range from A-F is associated with the first set A-F in the partitioned table space. Examiner used Iyer's teaching to show that different ranges of key values associated with different set of data



in a table space as shown in fig. 4 and as cited in the columns and lines in the rejected claims.

Iyer et al. especially teach "For a partitioned table 108 space, another parameter, which is optional, specifies the partition to reorganize" – col. 7, lines 10-45, (especially lines 40-41). Since Iyer et al. allow the reorganize data in a partition, and also Iyer et al. do not specify that a different free space parameter can not be assigned to that partition during the reorganization process, Iyer et al. do not teach away from the Appellant's independent claims.

Examiner disagrees that Pereira fails to provide the claimed elements missing from Iyer that Iyer et al. do not explicitly teach a database file's free space may be managed non-uniformly. However, Pereira teaches the DBA sets the PCTFREE variable depending on how the database table is to be used. For example, if a table is to have frequent updates, additional PCTFREE would be established so that enough space is available to allow any necessary row migration to occur within the same block...If the average free space for a table is high, the DBA may decide to rebuild the table with lower PCTFREE...if too much migration is taking place and that it may be preferable to rebuild the tables with optimal values for PCTFREE and/or PCTUSED- col. 4, lines 4-50; COL. 6, LINES 36-48. Therefore, depends on the on how a table/segment/partition is to be

used, the associated free space can be determined/managed accordingly, and thus, free space is distributed non-uniformly within a database file.

Because Iyer et al.'s teaching allow to reorganize data in a partition/set of rows within partitions in a database file, thus, depends on how the database table/set of rows is to be used, Pereira teaches the reorganization of data can be established accordingly.

### **Argument II**

Appellant argues on pages 17-18, section 5 that: "There is no motivation to combine Iyer and Pereira..."

**In response** to the Appellant's above argument, Examiner disagrees. The motivation to combine is on page 4, last four lines of the first paragraph. It is simple to understand the benefit of allowing the reorganization of data within a particular partition/set of rows among partitions/sets of rows appropriately based on its usage, that not only increase the database system's performance (e.g. processes data faster), but can also reduces related costs.

### **Argument III**

Appellant argues on pages 20-22, section 3 and 3b that: "Iyer in view of Eberhard fails to disclose each claimed element of independent claims 35 and 39..." "At no time does Iyer teach that a database file's free space may be managed non-uniformly by

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distributing free space differently for ranges of key values... In fact, Iyer expressly teaches that the non-uniform distribution of free space is a type of degradation that can lead to poor performance... Iyer actually teaches away from the claimed elements of these independent claims... However, Eberhard fails to disclose the claimed elements missing from Iyer..."

**In response** to the Appellant's above argument, Examiner disagrees. The second prior art Eberhard was used to show that a database file's free space may be managed non-uniformly. However, Iyer et al. teach in fig. 1, and col. 4, lines 5-30 that the same table space TS#1 with different partitions: P1, P2, P3 that tables and the reorganizer 112 comprises logical and physical arrangement of the tables and the associated indices; Fig. 4 and col. 6, lines 3-63, the clustering index 400 with the range from A-F is associated with the first set A-F in the partitioned table space. Examiner used Iyer's teaching to show that different ranges of key values associated with different set of data in a table space as shown in fig. 4 and as cited in the columns and lines in the rejected claims.

Iyer et al. especially teach "For a partitioned table 108 space, another parameter, which is optional, specifies the partition to reorganize" – col. 7, lines 10-45, (especially lines 40-41). Since Iyer et al. allow the reorganize data in a partition, and also Iyer et al. do not specify that a different free space parameter can not be assigned to that partition

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during the reorganization process, Iyer et al. do not teach away from the Appellant's independent claims.

Regarding the Appellant's argument that "In fact, Iyer expressly teaches that the non-uniform distribution of free space is a type of degradation that can lead to poor performance..." Examiner disagrees. In the section "Response to Arguments" in the Final Rejection, Examiner states that "However, as records have been added, deleted, inserted etc...Iyer et al. teach that the storage structures can degrade. Reorganization removes such structural degradation. Specifically, reorganization distributes free space evenly. This does not mean that Iyer et al. teach: "uniformly manage the free space in one file". This means that the free space assigned to a set of rows/table/partition etc...would be degraded and the reorganization process will help distribute free space as defined."

Examiner disagrees that Eberhard fails to provide the claimed elements missing from Iyer that Iyer et al. do not explicitly teach a database file's free space may be managed non-uniformly. Eberhard et al. teach database execution cost and system performance estimator – the abstract. Eberhard et al. teach accepting user input for at least one of the first values – col. 7, lines 35 to col. 8, line 5; fig. 2b, items 211-213; fig. 2c, items 221-222 (table definition in 2c allows user to define/assign pctfree for each table, in this example table STOCK. Users

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have the ability to assign different pctfree to different tables/partitions.

Thus, free space is distributed non-uniformly between tables/partitions of data). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Iyer et al.'s teaching with Eberhard et al.'s teaching in order to allow more flexible utilization of free spaces, which is more appropriately changed to different usage environments.

#### **Argument IV**

Appellant argues on pages 22-23, section 5 that: there is no motivation to combine Iyer and Eberhard.

**In response** to the Appellant's above argument, Examiner disagrees. The motivation to combine is on page 9, the first paragraph. It is simple to understand the benefit of allowing the reorganization of data within a particular partition/set of rows among partitions/sets of rows appropriately based on its usage, that not only increase the database system's performance (e.g. processes data faster), but can also reduces related costs.

Eberhard's teaching allows more flexible utilization of free spaces, which is more appropriately changed to different usage environments.

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**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Linh Black', with a stylized, cursive script.

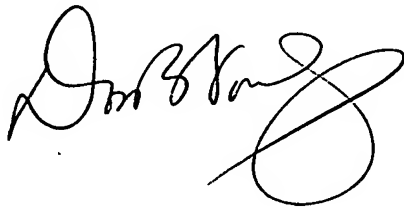
Linh Black

Examiner

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Conferees:

Don Wong

A handwritten signature in black ink, appearing to read 'Don Wong', with a stylized, cursive script.

Hosain Alam

A handwritten signature in black ink, appearing to read 'Hosain Alam', with a stylized, cursive script.

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